

DATA REGARDING THE SEQUOIA GIGANTEA.

Mr. PLATT, of Connecticut, presented the following

DATA REGARDING THE INTERNAL STRUCTURE, AGE, AND GROWTH OF THE BIG TREES (SEQUOIA GIGANTEA) OF CALIFORNIA, BY WILLIAM R. DUDLEY, PROFESSOR OF BOTANY, LELAND STANFORD JUNIOR UNIVERSITY, PALO ALTO, CAL.

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LELAND STANFORD JUNIOR UNIVERSITY,
DEPARTMENT OF SYSTEMATIC BOTANY,
Stanford University, Cal., February 2, 1904.

DEAR SIR: There is a bill before the Senate, introduced, I think, by Senator Bard, in which all who know the big trees of California are deeply interested.

In support of the movement in favor of national acquirement of the Calaveras groves of big trees, I beg leave to present a phase of the matter somewhat different from the usual ones, as it includes facts relating to the growth of these remarkable objects which have never before been published.

In order to obtain unquestionable data regarding the internal structure of the big trees (*Sequoia gigantea*), the writer visited, in 1900, the cut-over private claims of the Sanger Lumber Company, in the Converse Basin, Kings River, Fresno County, Cal., elevation 5,500 to 6,500 feet above the level of the sea.

1. The age of the trees can only be obtained by actually counting the concentrated rings of growth on the cross section of the felled trunk. Of the trees carefully examined and the rings counted the oldest possessed 2,425 rings, or had begun its existence 525 B. C. Extended scrutiny undoubtedly would bring to light trees that were older, although few in number. I do not expect any to exceed 3,000 years in this cutting.

Does each annular ring of the structure seen in cross section represent a year's growth? It does in the climate of the Pacific Coast, with its sharply marked wet and dry seasons. I have been able repeatedly to demonstrate this in Monterey pines, Monterey cypresses, *Sequoia sempervirens*, and even in *Sequoia gigantea* itself in such specimens in the arboretum, of Stanford University as have been removed on account of injury from insect attack or drouth.

2. A remarkable recuperative power following an injury was found after examination of the *Sequoias* of the Converse Basin. The effects

of certain tremendous forest fires occurring centuries ago were registered in the trunks of these trees and the record completely concealed by subsequent healthy growth. Among a number of similar cases the most instructive record of these ancient forest fires was observed in a tree of moderate size—about 15 feet in diameter—5 feet from the ground. It was 270 feet in height and 2,171 years old.

This tree when felled had an enormous surface burn on one side 30 feet in height and occupying 18 feet of the circumference of the tree; this was found to have been due to a fire occurring in A. D. 1797. The tree when cut, in 1900, had already occupied itself for 103 years in its efforts to repair this injury, its method being the ingrowing of the new tissue from each margin of the great black wound. When the tree was cut the records of three other fires were revealed. The history of the tree was as follows:

271 B. C. it began its existence.

The first year of the Christian era it was about 4 feet in diameter above the base.

245 A. D., at 516 years of age, occurred a burning on the trunk 3 feet wide. One hundred and five years were occupied in covering this wound with new tissue. For one thousand one hundred and ninety-six years no further injuries were registered.

1441 A. D., at 1,712 years of age, the tree was burned a second time in two long grooves 1 and 2 feet wide, respectively. Each had its own system of repair.

One hundred and thirty-nine years of growth followed, including the time occupied by covering the wounds.

1580 A. D., at 1,851 years of age, occurred another fire, causing a burn on the trunk 2 feet wide, which took fifty-six years to cover with new tissue.

Two hundred and seventeen years of growth followed this burn.

1797 A. D., when the tree was 2,068 years old, a tremendous fire attacked it, burning the great scar 18 feet wide.

One hundred and three years, between 1797 and 1900, had enabled the tree to reduce the exposed area of the burn to about 14 feet in width.

It is to be noted that in each of the three older burns there was a thin cavity occupied by the charcoal of burned surface, but the wounds were finally fully covered and the new tissue above was full, even, continuous, and showed no sign of distortion or of the old wound.

The above details are given to show the wonderful vitality and freedom from disease and decay possessed by these trees. If protected from fire and the lumberman they would undoubtedly live to a much greater age than at present, and would furnish the best living objects for scientific study and measurement covering a long period of years extending from one human generation to another. These measurements would have a bearing on our knowledge of the laws of growth as affected by periods of varying climatic conditions. It happens that the only measurements already made were made on the Calaveras big trees thirty years ago by the geological survey of California. It comes near being a crime to not only destroy objects among the most interesting in the world, but to throw away data useful to the science of the future, as will be done if the Calaveras trees are felled.

So long as these trees are not in the hands of the United States or the people of it they are not safe from destruction. Railroads are now

approaching them. Machinery is in use quite adequate to the destruction of the largest trees, and the trees will be cut by the lumbermen when it will pay.

The State of California does not attempt this purchase because it has recently appropriated (1901) \$250,000 for the purchase of a park for similar purposes, namely, to preserve the *Sequoia sempervirens* (the Coast Range redwood). This park has already been purchased, and by act of its legislature the State is bound to forever protect these trees "for the benefit of succeeding generations and the glory of the Commonwealth."

The citizens of the State are also raising funds for the purchase of a forest park on Mount Tamalpais, adjacent to San Francisco. California, with only 1,500,000 people, has responded generously and as fully as her resources will allow.

All the big trees (*Sequoia gigantea*) occupy the heart of the great forest belt of the Sierra Nevada Mountains, and their preservation is therefore important to stream protection and to the irrigation works contemplated for the San Joaquin Valley; nevertheless the utilitarian plea is not here entered in asking for the purchase of the Calaveras groves. We ask it because the species is unique—it is found in no other country, no other State, nowhere but in a portion of the Sierra Nevada Range, and hence it is appropriate it should be under the control of the nation. We ask it because the Calaveras trees are historically, by far, the most interesting of the big trees; because their preservation will afford the highest and most innocent gratification to the thousands of people who will visit them; and lastly, we believe their preservation will be most useful to the scientific observer of the future in his work on problems in the origin and history of species, in climatology, in the laws of growth. All this work has a bearing on the practical problem how to treat our forests so as to equalize the varying amounts of precipitation of moisture in the semiarid region to the best advantage of our water supply.

We solicit most earnestly your favorable consideration of this bill.

Yours, very respectfully,

WILLIAM RUSSEL DUDLEY,
Vice-President American Forestry Association.

HON. O. H. PLATT,
United States Senate, Washington, D. C.

